

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Hak-Sun CHANG, et al.) Group Art:
) 2871
SERIAL NO. 10/810,887)
) Examiner:
DATE FILED: March 29, 2004) VU, Phu
)
FOR: LIQUID CRYSTAL DISPLAY) Confirmation No.
) 1078

APPEAL BRIEF

1. **THE REAL PARTY IN INTEREST**

The real party in interest in this appeal is Samsung Electronics Co. Ltd. Ownership by Samsung Electronics Co. Ltd. is established by an assignment document recorded for this application on July 30, 2004 on Reel 015625 and Frame 0529.

2. **RELATED APPEALS AND INTERFERENCES**

Applicants are unaware of any related patent applications or patents under any appeal or interference proceeding.

3. **STATUS OF CLAIMS**

Claims 1-2, 5-7 and 10 stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Yamakita (U.S. Patent No. 6,661,491, hereinafter "Yamakita") in view of Sato (U.S. Patent No. 4,987,012, hereinafter "Sato").

Claims 3-4, 8-9, 14-15 and 20-21 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Yamakita in view of Sato and further in view of Motomura (U.S. Patent No. 6,103,323, hereinafter "Motomura").

Claim 11 stands rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Yamakita in view of Sato and further in view of Bos (U.S. Patent No. 5,410,422, hereinafter “Bos”).

Claims 12-13, 16, 18-19 and 22 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Yamakita in view of Sato and further in view of Watanabe (U.S. Patent No. 5,617,228, hereinafter “Watanabe”).

Claims 17 and 23 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Yamakita in view of Sato in view of Watanabe and further in view of Bos.

Claims 24-27 stand rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the enablement requirement. Claims 24-27 also stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Yamakita in view of Sato and Watanabe and further in view of Nakahara (U.S. Patent No. 6,724,448, hereinafter “Nakahara”).

Claims 1-27 are the claims still pending in the present application and currently being appealed.

4. STATUS OF AMENDMENTS

No claim amendments have been filed subsequent to final rejection.

5. SUMMARY OF CLAIMED SUBJECT MATTER

A concise explanation of the subject matter defined in each of the independent claims involved in the appeal is provided below.

Independent claim 1 is directed to a liquid crystal display device (“LCD”). Specifically, the liquid crystal display device of claim 1 is an optically compensated birefringence (“OCB”) type LCD. The claim limitation “wherein liquid crystal molecules on both substrates are aligned antiparallel to each other” of claim 1 identifies the LCD as an OCB type LCD. See paragraphs 14 and 42 of the application as filed. The apparatus of independent

claim 1 further comprises black spacers (elements 320 in FIG. 2) positioned between upper and lower substrates corresponding to a color filter panel and a TFT array panel (elements 200 and 100 of FIG. 2, respectively), the spacers in a pixel region determining a gap between the upper and lower substrates. The gap is filled with a liquid crystal layer (element 3 of FIG. 2). A common electrode 270 is disposed on the color filter panel 200 and a pixel electrode 190 is disposed on the TFT array panel 100. See FIG. 2 and paragraphs 0035-0038 of the application as filed.

Independent claim 6 is also directed to an LCD. Specifically, the alignment of the liquid crystal layer of the LCD of claim 6 is an OCB type alignment. See paragraphs 14 and 42 of the application as filed. The apparatus of claim 6 further comprises black spacers (elements 320 in FIG. 2) positioned between upper and lower substrates corresponding to a color filter panel and a TFT array panel (elements 200 and 100 of FIG. 2, respectively), the spacers in a pixel region determining a gap between the upper and lower substrates. The gap is filled with a liquid crystal layer (element 3 of FIG. 2). A common electrode 270 is disposed on the color filter panel 200 and a pixel electrode 190 is disposed on the TFT array panel 100. See FIG. 2 and paragraphs 0035-0038 of the application as filed.

Independent claim 12 is also directed to an LCD. Specifically, the alignment of the liquid crystal layer of the LCD of claim 12 is an OCB type alignment. See paragraphs 14 and 42 of the application as filed. The apparatus of claim 12 further comprises black spacers (elements 320 in FIG. 2) positioned between upper substrate and the lower substrate corresponding to the color filter panel and the TFT array panel (elements 200 and 100 of FIG. 2, respectively), the spacers in a pixel region determining a gap between the upper and lower substrates. See FIG. 2 and paragraphs 0035-0038 of the application as filed. Independent claim 12 further comprises the limitation wherein the light transmittance of the spacers is lower than 3 % and the number of spacers per square millimeter is less than 90. See paragraphs 0040-0041 and 0046-0047 of the application as filed. The gap is filled with a liquid crystal layer (element 3 of FIG. 2). A common electrode 270 is disposed on the color filter panel 200 and a pixel electrode 190 is disposed on the TFT array panel 100.

Independent claim 18 is also directed to an LCD. Specifically, the alignment of the liquid crystal layer of the LCD of claim 18 is an OCB type alignment. See paragraphs 14 and

42 of the application as filed. The apparatus of claim 18 further comprises black spacers (elements 320 in FIG. 2) positioned between upper substrate and the lower substrate corresponding to the color filter panel and the TFT array panel (elements 200 and 100 of FIG. 2, respectively), the spacers in a pixel region determining a gap between the upper and lower substrates. See FIG. 2 and paragraphs 0035-0038 of the application as filed. Independent claim 18 further comprises the limitation wherein the number of spacers per square millimeter is less than 90. See paragraphs 0040-0041 and 0046-0047 of the application as filed. The gap is filled with a liquid crystal layer (element 3 of FIG. 2). A common electrode 270 is disposed on the color filter panel 200 and a pixel electrode 190 is disposed on the TFT array panel 100.

6. GROUND S OF REJECTION TO BE REVIEWED ON APPEAL

The Examiner's rejection of claims 1-2, 5-7 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Yamakita in view of Sato.

The Examiner's rejection of claims 3-4, 8-9, 14-15 and 20-21 under 35 U.S.C. § 103(a) as being unpatentable over Yamakita in view of Sato and further in view of Motomura.

The Examiner's rejection of claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Yamakita in view of Sato and further in view of Bos.

The Examiner's rejection of claims 12-13, 16, 18-19 and 22 under 35 U.S.C. § 103(a) as being unpatentable over Yamakita in view of Sato and further in view of Watanabe.

The Examiner's rejection of claims 17 and 23 under 35 U.S.C. § 103(a) as being unpatentable over Yamakita in view of Sato in view of Watanabe and further in view of Bos.

7. ARGUMENT

A. THE EXAMINER'S REJECTION OF CLAIMS 1-2, 5-7 AND 10 UNDER 35 U.S.C. §103(a) IS IMPROPER

Applicants respectfully submit that the Examiner did not establish a prima facie case of

obviousness because the combination of Yamakita and Sato does not teach or suggest each and every limitation of claims 1-2, 5-7 and 10. In particular independent claims 1 and 6 of the present application patentably distinguish over the combination of Yamakita and Sato for at least the following reasons.

Yamakita is directed to a liquid crystal display. Yamakita discloses a liquid crystal display with a common electrode 2, a liquid crystal layer 4 injected between upper and lower substrates 3 and 5, and an element labeled 61 which is not mentioned in the detailed description. (See FIGS. 3, 4a, 4b and 24 and column 19 line 45 through column 20 line 38). The element 61 appears in a cross-sectional view schematically showing main elements of a semiconductor switching device (a thin film transistor "TFT" is shown as the switching device) portion of a liquid crystal display panel. (See column 19 lines 45-50).

Claim 1 of the present invention, as amended, recites: "A liquid crystal display, comprising: . . . spacers in a pixel region determining a gap between the upper and lower substrates; wherein liquid crystal molecules on both substrates are aligned antiparallel to each other, and the color of the spacers is black." (Emphasis added.) Claim 6 contains similar elements and explicitly claims the liquid crystal layer is an OCB type liquid crystal layer. Although Yamakita discloses an OCB mode LCD, the Examiner admits that Yamakita fails to teach or suggest black spacers. The Examiner then alleges that Sato teaches black spacers and that it would have been obvious to apply black spacers in the OCB mode LCD of Yamakita.

In an OCB mode LCD, retardation films are used to enhance the darkness of a black state of the display. The films are used to prevent a high luminance in a black state due to the slanting arrangement of the liquid crystal molecules when in proximity to the substrates. See paragraph 35 of the application as filed. However, the films may only decrease the luminance of the black state of the OCB mode LCD by a certain amount due to light leakage around spacers in the display. In the present invention, darkness of the black state of an OCB mode LCD is enhanced by using the black spacers.

Sato discloses that black particles may be formed by heat treating formed white particles and that both the white and black particles are particularly useful products as spacers

for liquid crystal display devices. See Abstract of Sato. There is no teaching, suggestion, or motivation in Sato to use a black spacer over a white spacer in an LCD display device, and certainly no teaching or suggestion to use a black spacer in an OCB mode LCD. Furthermore, even if element 61 of FIGS. 3, 4a, 4b of Yamakita is interpreted to be a spacer, Yamakita certainly does not teach or suggest any color thereof.

Yamakita discloses an OCB mode LCD and Sato discloses black spacers, but neither Yamakita nor Sato disclose any teaching or suggestion about the use of black spacers in an OCB mode LCD. Therefore, it is respectfully submitted that any combination of Sato and Yamakita is an improper hindsight combination coached by the present invention. Thus, it is respectfully submitted that the only basis for the motivation to combine relied upon by the Examiner is in Applicants' disclosure, and that such motivation is not so common or well known in the art that the Examiner is entitled to opine that a lay person having ordinary skill in the art would have appreciated it.

Because the Examiner has not identified a proper motivation for the combination of Yamakita and Sato Applicants submit that the rejection of independent claims 1 and 6 under 35 U.S.C. § 103(a) is improper. Claims 2 and 5 are dependent on independent claim 1 and claims 7 and 10 are dependent on independent claim 6, therefore claims 2, 5, 7 and 10 also are believed to be patentably distinguishable over Yamakita and Sato. Accordingly, Applicants respectfully request that the Examiner's rejection be reversed.

B. THE EXAMINER'S REJECTION OF CLAIMS 3-4, 8-9, 14-15 AND 20-21 UNDER 35 U.S.C. §103(a) IS IMPROPER

It is respectfully pointed out that claims 3-4 and 8-9 depend from claims 1 and 6, respectively, which are submitted as being allowable for defining over Yamakita in view of Sato as discussed above. Furthermore, it is respectfully submitted that the use of the 45 degree angle between the transmission axis of the polarizer and the slow axis of the retarder to improve lighting quality of polarized light taught in Motomura does not cure the deficiencies noted above with respect to Yamakita and Sato.

Independent claims 12 and 18 both claim liquid crystal displays comprising: . . . a liquid crystal layer injected between the upper substrate and the lower substrate, the alignment of the liquid crystal layer is OCB type; and black spacers positioned between the upper substrate and the lower substrate, the spacers in a pixel region determining a gap between the upper and lower substrates . . . (Emphasis added).

As discussed above with respect to independent claims 1 and 6, Yamakita discloses an OCB mode LCD and Sato discloses black spacers, but neither Yamakita nor Sato disclose any teaching or suggestion about the use of black spacers in an OCB mode LCD. Furthermore, it is respectfully submitted that the use of the 45 degree angle between the transmission axis of the polarizer and the slow axis of the retarder to improve lighting quality of polarized light taught in Motomura does not cure the deficiencies noted above with respect to Yamakita and Sato.

Therefore, it is respectfully submitted that any combination of Yamakita, Sato and Motomura is an improper hindsight combination coached by the present invention. Thus, it is respectfully submitted that the only basis for the motivation to combine relied upon by the Examiner is in Applicants' disclosure, and that such motivation is not so common or well known in the art that the Examiner is entitled to opine that a lay person having ordinary skill in the art would have appreciated it.

Because the Examiner has not identified a proper motivation for the combination of Yamakita, Sato and Motomura Applicants submit that the rejection of independent claims 12 and 18 under 35 U.S.C. § 103(a) is improper. Claims 14 and 15 are dependent on independent claim 12 and claims 20 and 21 are dependent on independent claim 18, therefore claims 14, 15, 20 and 21 also are believed to be patentably distinguishable over Yamakita, Sato and Motomura. Accordingly, Applicants respectfully request that the Examiner's rejection be reversed.

C. THE EXAMINER'S REJECTION OF CLAIM 11 UNDER 35 U.S.C. §103(a) IS IMPROPER

It is respectfully pointed out that claim 11 depends from claim 6, which is submitted as being allowable for defining over Yamakita in view of Sato as discussed above. Furthermore, it is respectfully submitted that use of a compensation layer that has a smaller dispersion of birefringence than the liquid crystal layer as allegedly taught in Bos does not cure the deficiencies noted above with respect to Yamakita and Sato.

Accordingly, it is respectfully submitted that Yamakita in view of Sato and further in view of Bos, alone or in combination, do not teach each and every limitation of claim 11, and therefore Applicants submit that the rejection of claim 11 under 35 U.S.C. § 103(a) is improper. Accordingly, Applicants respectfully request that the Examiner's rejection be reversed.

D. THE EXAMINER'S REJECTION OF CLAIMS 12-13, 16, 18-19 AND 22 UNDER 35 U.S.C. §103(a) IS IMPROPER

It is respectfully pointed out that claims 12 and 18 are submitted as being allowable for defining over Yamakita in view of Sato as discussed above. Furthermore, it is respectfully submitted that use of a number of spacers less than 90 in one square millimeter as allegedly taught in Watanabe does not cure the deficiencies noted above with respect to Yamakita and Sato.

Accordingly, it is respectfully submitted that Yamakita in view of Sato and further in view of Watanabe, alone or in combination, do not teach each and every limitation of claims 12 and 18, and therefore Applicants submit that the rejection of claims 12 and 18 under 35 U.S.C. § 103(a) is improper. In addition, claims 13 and 16 depend from independent claim 12 and claims 19 and 22 depend from independent claim 18, and therefore are submitted as being allowable for at least the reasons submitted above with respect to claims 12 and 18. Accordingly, Applicants respectfully request that the Examiner's rejection be reversed.

E. THE EXAMINER'S REJECTION OF CLAIMS 17 AND 23 UNDER 35 U.S.C. §103(a) IS IMPROPER

It is respectfully pointed out that claim 17 depends from independent claim 12 and claim 23 depends from independent claim 18, which are submitted as being allowable for defining over Yamakita in view of Sato as discussed above. Furthermore, it is respectfully submitted that use of a compensation layer that has a smaller dispersion of birefringence than the liquid crystal layer as allegedly taught in Bos or the use of a number of spacers less than 90 in one square millimeter as allegedly taught in Watanabe does not cure the deficiencies noted above with respect to Yamakita and Sato.

Accordingly, it is respectfully submitted that Yamakita in view of Sato and further in view of Bos and further in view of Watanabe, alone or in combination, do not teach each and every limitation of claims 12 and 18, and therefore Applicants submit that the rejection of claims 17 and 23 under 35 U.S.C. § 103(a) is improper. Accordingly, Applicants respectfully request that the Examiner's rejection be reversed.

F. CONCLUSION

The Examiner never established a prima facie case showing of obviousness in rejecting claims 1-23 under 35 U.S.C. §103(a). In particular, the Examiner has not identified a proper motivation for the combination of Yamakita and Sato. Furthermore, there is no teaching or suggestion in either Yamakita or Sato, either alone or in combination, to combine at an OCB mode LCD **and** a black spacer. For these reasons, it is respectfully submitted that the rejection under 35 U.S.C. §103(a) should be reversed.

Please charge any costs incurred in the filing of this Appeal Brief, along with any other associated costs, to Deposit Account No. 06-1130.

Respectfully Submitted,

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8. CLAIMS APPENDIX

1. (Previously Presented) A liquid crystal display, comprising;
an upper substrate with a common electrode thereon;
a lower substrate with a pixel electrode thereon;
a liquid crystal layer injected between the upper substrate and the lower substrate;
and spacers positioned between the upper substrate and the lower substrate, the spacers
in a pixel region determining a gap between the upper and lower substrates;
wherein liquid crystal molecules on both substrates are aligned antiparallel to each
other, and the color of the spacers is black.

2. (Original) A liquid crystal display of claim 1,
wherein the liquid crystal display further comprises a compensation film and a
polarizer.

3. (Original) A liquid crystal display of claim 2,
wherein a slow axis of the compensation film is not parallel to a transmittance axis
of the polarizer.

4. (Original) A liquid crystal display of claim 3,
wherein the angle between the slow axis of the compensation film and the
transmittance axis of the polarizer is about 45 degree.

5. (Original) A liquid crystal display of claim 1,
wherein the spacers are ball type or column type.

6. (Previously Presented) A liquid crystal display, comprising;
an upper substrate with a common electrode thereon;
a lower substrate with a pixel electrode thereon;
a liquid crystal layer injected between the upper substrate and the lower substrate;

and

spacers positioned between the upper substrate and the lower substrate, the spacers in a pixel region determining a gap between the upper and lower substrates;

wherein the alignment of the liquid crystal layer is OCB type, and the spacers are black.

7. (Original) A liquid crystal display of claim 6,
wherein the liquid crystal display further comprises a compensation film and a polarizer.

8. (Previously Presented) A liquid crystal display of claim 7,
wherein a slow axis of the compensation film is not parallel to a transmittance axis of the polarizer.

9. (Previously Presented) A liquid crystal display of claim 8,
wherein an angle between the slow axis of the compensation film and the transmittance axis of the polarizer is about 45 degrees.

10. (Original) A liquid crystal display of claim 6,
wherein the spacers are ball type or column type.

11. (Original) A liquid crystal display of claim 7,
wherein the compensation film has a smaller dispersion of birefringence than the liquid crystal layer.

12. (Previously Presented) A liquid crystal display, comprising;
an upper substrate with a common electrode and a color filter thereon;
a lower substrate with a pixel electrode, and an array of thin film transistors;
a liquid crystal layer injected between the upper substrate and the lower substrate,
the alignment of the liquid crystal layer is OCB type; and

black spacers positioned between the upper substrate and the lower substrate, the spacers in a pixel region determining a gap between the upper and lower substrates, wherein light transmittance of the spacers is lower than 3 % and number of the spacers is less than 90 in one square millimeter.

13. (Original) A liquid crystal display of claim 12, wherein the liquid crystal display further comprises a compensation film and a polarizer.

14. (Original) A liquid crystal display of claim 13, wherein a slow axis of the compensation film is not parallel to a transmittance axis of the polarizer.

15. (Original) A liquid crystal display of claim 14, wherein an angle between the slow axis of the compensation film and the transmittance axis of the polarizer is about 45 degree.

16. (Original) A liquid crystal display of claim 12, wherein the spacers are ball type or column type.

17. (Original) A liquid crystal display of claim 12, wherein the compensation film has a smaller dispersion of the birefringence than the liquid crystal layer.

18. (Previously Presented) A liquid crystal display, comprising;
an upper substrate with a common electrode thereon;
a lower substrate with a pixel electrode thereon;
a liquid crystal layer injected between the upper substrate and the lower substrate, the alignment of the liquid crystal layer is OCB type; and
black spacers positioned between the upper substrate and the lower substrate, the spacers in

a pixel region determining a gap between the upper and lower substrates,

wherein liquid crystal molecules of the liquid crystal layer on both the upper substrate and the lower substrate are aligned antiparallel to each other, and number of the spacers is less than 90 in one square millimeter.

19. (Original) A liquid crystal display of claim 18,
wherein the liquid crystal display further comprises a compensation film and a polarizer.

20. (Original) A liquid crystal display of claim 19,
wherein a slow axis of the compensation film is not parallel to a transmittance axis of the polarizer.

21. (Original) A liquid crystal display of claim 20,
wherein an angle between the slow axis of the compensation film and the transmittance axis of the polarizer is about 45 degrees.

22. (Original) A liquid crystal display of claim 18,
wherein the spacers are ball type or column type.

23. (Original) A liquid crystal display of claim 18,
wherein the compensation film has a smaller dispersion of the birefringence than the liquid crystal layer.

24. (Previously Presented) A liquid crystal display of claim 1,
wherein the spacers contact the common electrode and the pixel electrode.

25. (Previously Presented) A liquid crystal display of claim 6,
wherein the spacers contact the common electrode and the pixel electrode.

26. (Previously Presented) A liquid crystal display of claim 12,
wherein the spacers contact the common electrode and the pixel electrode.

27. (Previously Presented) A liquid crystal display of claim 18, wherein the spacers
contact the common electrode and the pixel electrode.

9. EVIDENCE APPENDIX

No evidence other than cited references by Examiner.

10. RELATED PROCEEDINGS APPENDIX

Applicants are not aware of any related proceedings for this patent application.